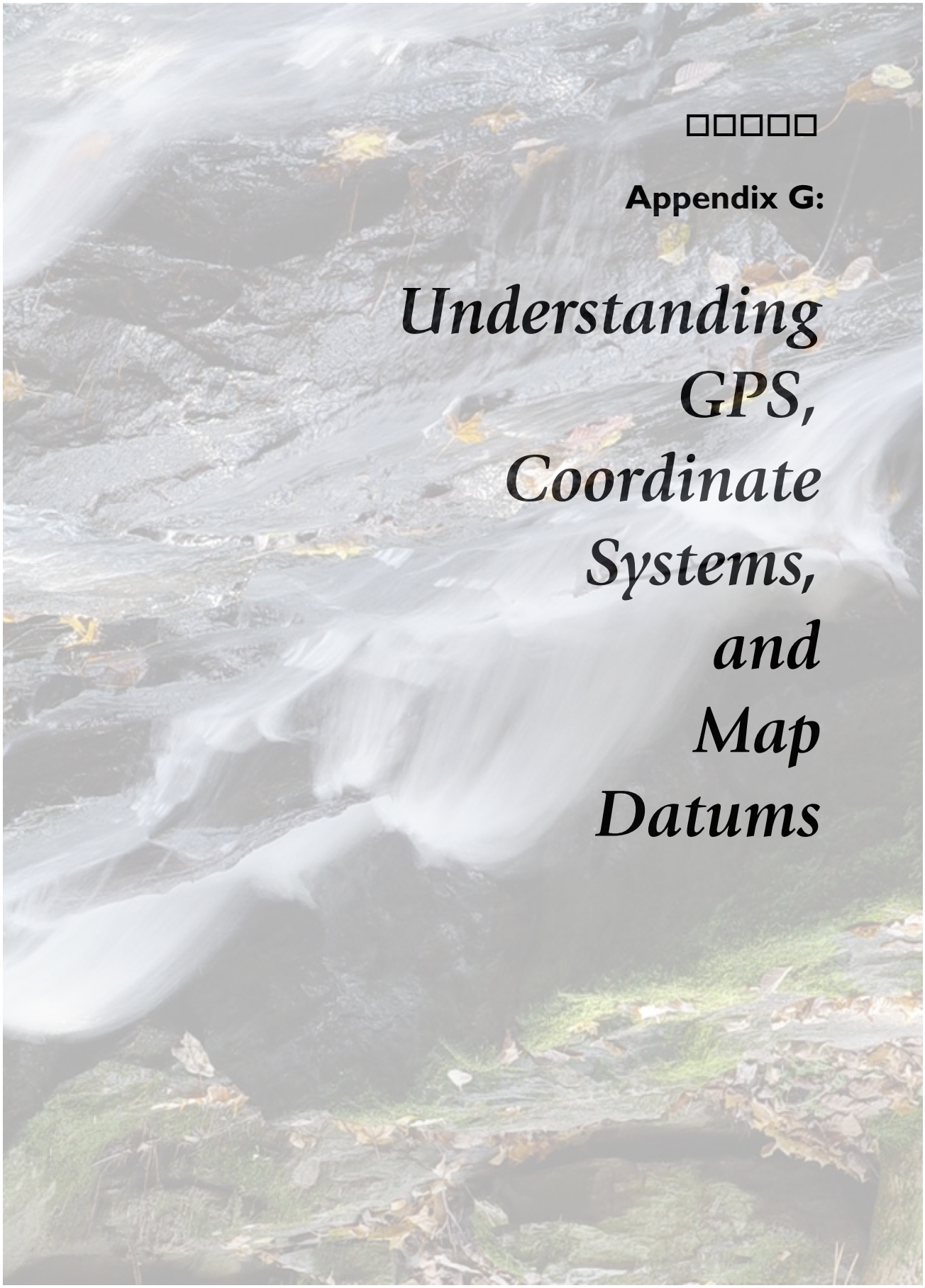

Appendix G:

Understanding GPS, Coordinate Systems, and Map Datums

Appendix G
Understanding GPS, Coordinate Systems, and Map Datums

If you are going to bring a GPS (global positioning system) unit with you when you do your stream habitat survey, make sure to familiarize yourself with its functions. The owner's manual should provide you with some good information.

- **Make sure that your GPS's map *datum*[1] is set to WGS84a.** (NAD83 is a fairly acceptable alternative, but NAD27 will cause coordinates to be erroneous.) This is the default setting on many GPS units nowadays, although it is important to check your model and user's manual.
- **Make sure that your GPS's geographic coordinate system is set to either the UTM (Universal Transverse Mercator) or Latitude & Longitude system**. Some examples of what UTM and Lat/Long readings look like are provided in Table G-1 below. **The most important thing you can do is to be sure to write down all the coordinate numbers that are shown on your GPS unit.** If you round off your numbers, we might not be able to tell whether you're in Kittery or Presque Isle.
- **The UTM zone for the state of Maine is Zone 19 (north).** Some units may display a "T" after the "19". These coordinates are simply the number of meters in each direction from the southwest corner (coordinates 0 E / 0 N) of a rectangle that defines the extent of UTM Zone 19 North.

SCS DATASHEET TYPES:

There are two SCS datasheet set types available: UTM Zone 19 and Latitude/ Longitude. The **UTM system is preferred** because that is what most Maine state agencies use (including Maine DEP and Maine DIF&W), however Lat/Long is still an option.

GPS ERROR:

All GPS units have some error associated with them. The older and less expensive the unit, the greater the room for error (consult with your user's manual). Additionally, if someone is measuring in units of degrees-minutes-seconds *(Latitude and Longitude)*, accuracy is decreased by an additional (roughly) 100 feet unless decimal seconds are used (e.g., coordinates having one decimal place after the "seconds" number). A good method to reduce error is to wait as long as possible after powering up so your unit can be receiving as many satellites as possible. Most models indicate how many satellites they are receiving at any given time.

GPS users should be forewarned that in dense tree canopies, ravines, or canyons, more time is needed to acquire satellites and, thus, geographic coordinates.

FOR MORE INFORMATION:

For more information about coordinate systems, mapping, projections, and GPS basics, visit these websites (and click on exercises such as Intro to GPS, Topographic Maps, or GIS Primer)**:**

- http://education.usgs.gov/
- http://geology.isu.edu/geostac/
- http://infodome.sdsu.edu/research/guides/maps/basics.shtml.

Table G-1:
Examples of Latitude/Longitude and UTM coordinate data

X COORDINATE	Y COORDINATE	COORDINATE SYSTEM
70° 16' 49.3" (W; longitude)	43° 41' 18.0" (N; latitude)	Latitude/Longitude (degrees/minutes/seconds)
70° 16.822' (W; longitude)	43° 41.300 (N; latitude)	Latitude/Longitude (degrees/decimal minutes)
0396812 (easting)	4838054 (northing)	UTM, Zone 19

[1]A datum describes the model that was used to match the location of features on the ground to coordinates and locations on the map. The Global Positioning System uses an earth centered datum called the World Geodetic System 1984 or WGS 84. WGS 84 was adopted as a world standard from a datum called the North American Datum of 1983 or NAD 83. Most USGS topographic maps are based on an earlier datum called the North American Datum of 1927 or NAD 27. In the Continental United States the difference between WGS 84 and NAD 27 can be as much as 200 meters.